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INSTRUCTIONS FOR CARE AND MAINTENANCE OF STEEL HULLS

Compiled and Promulgated by the

AMERICAN MARINE STANDARDS
COMMITTEE

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FOREWORD

The American Marine Standards Committee developed the following instructions, as part of a series of manuals dealing with the operation and upkeep of ships, for handy reference by persons interested.

These instructions are issued with singleness of purpose to improve conditions in the marine industry by promoting uniform good practice for the maintenance of ships in the interest of efficient operation. It is believed that they cover the essentials for effective and economical preservation of the ship's structure, but they are intended only for general guidance as conditions arise requiring variations and the exercise of personal judgment.

The committee intends to review its publications from time to time for their possible improvement so as to keep pace with development of commercial products and good practice. Users of these instructions are asked, in the spirit of the preceding, to cooperate by contributing criticisms and suggestions.

INSTRUCTIONS FOR CARE AND MAINTENANCE OF STEEL HULLS

PRESERVATION OF EXTERIOR

Bottom—Salt Water Navigation.

1. Periodical dry-docking, for examination, cleaning, and painting, should be at intervals of from 6 to 12 months, depending on fouling conditions of the waters navigated and the length of lay-overs between voyages.

2. Steel vessels having lay-overs in southern waters are more subject to corrosion than in northern waters.

3. Scraping of hull should begin immediately upon dry-docking, even to the extent, where practicable, of scrapers following the receding water level down the ship's sides, as the dock is pumped out. The water line should be examined for deposits of oil or grease, and, if present, such should be removed after scraping by washing with gasoline or other satisfactory solvent. If grass or moss is present, wire brushing is essential to a good job of cleaning. It is good practice to follow the scraping and/or brushing by hose washing with fresh water.

4. It is essential to wait until the steel is dry before applying coatings.

5. The first coat should be anticorrosive composition. Where the docking periods are close, due to fouling conditions, one coat of the anticorrosive composition is usually sufficient; but where docking periods run over eight months, it is good practice to apply two coats. The second coat should be tinted to facilitate verification of its application and its inspection.

6. Before the anticorrosive composition sets hard it should be covered by a coat of antifouling composition.

7. The bottom coatings just specified are usually applied up to the deep water line, but on a vessel liable to lie light or run in ballast it may be deemed advisable to so coat only to the light water line and to apply a second or even third coat of anticorrosive on the boot-topping or between the light and load lines where exposed to both wind and water.

8. There are various commercial mixtures offered for all the purposes stated. The selection of that best suited to the service conditions of any ship can best be dictated by experience on each run.

9. The bottom should be examined for rusted or corroded spots or areas, and, if such are found, they should be especially well cleaned and painted with red lead or other suitable paint before applying the anticorrosive coating.

10. A vessel should be floated before the bottom coatings entirely harden. Forty-eight hours is about the limit of lay in dry dock after the final application. Twenty-four hours should be about the limit of lay to prevent damage to a coating already in service, whether or not it appears to need renewal; as, if exposed to air longer than that time, it will almost certainly leave the bottom after a short period of further service.

11. Some anticorrosive and antifouling paints contain alcohol as the vehicle. These paints dry almost as fast as they are applied, and if they are allowed to remain exposed to the air for more than a few hours they are likely to crack and flake off. The length of time which a vessel can remain in dock without impairment to bottom paint already on and the practice as to the maximum time between the application of antifouling paint and the undocking of the vessel should be governed by the characteristics of the paints.

12. Care should be taken in cleaning and coating to shift bilge blocks and shores and give the portions of the vessel originally covered by them the same attention as the balance

of the bottom. It is very difficult to give a flat keel this attention on account of the blocks, and therefore this should be kept in mind and effort made to reach all parts of such keel at alternate dockings by keeping careful record of block spacing and changing the position of the vessel relatively to a noted master block at each docking.

13. The entrance and run of a vessel along the water line should receive special attention, as corrosion due to air in disturbed water and/or possible galvanic action are most likely to occur in these parts.

14. Steel vessels carrying bronze propellers must be protected from galvanic action upon the steel hull by rolled zinc plates, or equivalent, properly attached to the stern structure. These plates should not be less than one-half inch thick and the ratio of their exposed surface to that of the propeller's surface should be not less than 30 per cent. Zincs must not be coated.

Topsides and Weather Deck.

15. The principal care to be exercised in keeping topsides and exposed steel deck erections in condition, is that whatever coating is selected it be applied on surfaces carefully freed of loose old paint, scale or rust, salt, or other foreign substance. Red lead on bare steel covered by desired color, or white lead or zinc worked to color directly on steel, have proven satisfactory. Boiled linseed oil or fish oil is recommended as an anticorrosive coating for exposed steel decks subject to wear which paint will not withstand.

16. For the preservation of wooden weather decks, coating with Stockholm tar and raw linseed oil mixed in equal parts and applied boiling hot on the dry decking, is recommended.

PRESERVATION OF INTERIOR

Cargo Spaces.

17. The frequency of periodical cleaning and coating of holds below turn of bilge is controlled largely by the nature of cargoes carried, but for ordinary merchandise carriers cleaning and coating every 24 months should be sufficient to keep these spaces in good condition. The same recommended period of conditioning applies to single bottom holds. No regular period of conditioning of upper portion of holds or 'tween-deck spaces is recommended, but such should receive local attention as required.

18. In periodical overhaul of holds the tank top ceiling and bilge limber boards should be lifted and the surfaces thoroughly cleaned and coated. Coating with approved bituminous composition or pine tar and cement is recommended.

19. Care should be taken during overhaul of holds to remove and renew any cracked and/or broken cement in bilges or waterways, first scaling to bare steel and cleaning the surfaces to be recemented. Cement filling should be of mixture not leaner than 1 part of Portland cement to 2 of clean sharp sand.

20. Particular care should be exercised in scaling and coating the framing where it passes through decks, as this is always a point of wastage. It is recommended that attention be given to these parts at periods intermediate to the general overhaul of holds.

Spaces Other than Cargo.

21. Other places to be noted for special attention are the auxiliary flats in machinery or 'tween-deck spaces, points where leakage or sweat may occur, where coal ash may lie intentionally or otherwise, and any sheathed or unsheathed steel work subject to dampness or lack of ventilation, such as the framing, tank top, etc., directly under boilers, shaft alleys, chain lockers, lazarettes, fantail, ice boxes, lavatories, etc.

Bunkers.

22. Bunkers for coal are particularly liable to wastage from chemical action of contents under conditions of dampness and poor ventilation.

23. Bituminous compostion is recommended for bunker coating, but care must be taken in applying it that all scale and rust are first removed from the steel.

24. If paint is used for coating the bunkers, they should be cleaned and coated at least once a year.

25. Oil bunkers should not be coated inside.

Tanks.

26. Fresh-water and ballast tanks should be coated inside with a cement wash.

27. It is essential that surfaces so coated be previously cleaned to bare metal and that the coating be allowed to dry thoroughly before water is run in.

28. No regular period of fresh-water tank cleaning and cementing can be specified, as characteristics of the water carried control this, but ballast tanks should be overhauled and coated at intervals of not more than 24 months.

29. After the cleaning or cementing of fresh-water tanks they should be sterilized, when being rinsed, with a solution of calcium hypochlorite (commercially known under the trade name of "chloride of lime"). The procedure is to place an appropriate quantity of fresh water in the tank concerned and to add calcium hypochlorite to the water in the proportion of 3 ounces of the hypochlorite to 1,000 gallons of water. The walls and top of the tank, as well as the distribution system should be flushed with the resulting solution. After allowing the solution to remain in the tank for at least 30 minutes, drain the tank and continue rinsing with fresh water. The process is neither dangerous nor poisonous in any way.

30. Oil tanks and double-bottom spaces in which oil is carried should not be coated inside, but should be cleaned of sludge and sediment at intervals as required. The cleaning of such spaces, however, involves serious hazards to life and property, against which proper safeguards must be rigidly enforced. It is not the purpose of the present instructions to cover this phase of ship maintenance. The care and maintenance of oil tanks is to be the subject of another document in which the hazards and methods will be specified.

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